What is claimed is:

1. An isolated polypeptide comprising the amino acid sequence of SEQ ID NOs: 2 or 18, wherein at least one of the amino acids is in the D-isoform.

2. The polypeptide of claim 1, wherein said amino acid sequence is SEQ ID NO: 2 and said D-isoform amino acid is selected from the group consisting of [D-Ser-1]; [D-Cys-2]; [D-Ser-3]; [D-Leu-4]; [D-Pro-5]; [D-Gln-6]; and [D-Thr-7].

3. The polypeptide of claim 1, wherein all of said amino acids are in the D-isoform.

4. The polypeptide of claim 1, wherein said polypeptide modulates body mass.

5. The polypeptide of claim 1, wherein said polypeptide reduces food intake.

6. The polypeptide of claim 1, wherein said polypeptide modulates insulin release.

7. The polypeptide of claim 1, wherein said polypeptide does not interact directly with a leptin receptor.

8. The polypeptide of claim 1, wherein said polypeptide does not interact with the MCL-4 receptor.

9. The polypeptide of claim 1, wherein said polypeptide is capable of penetrating the blood brain barrier.

10. The polypeptide of claim 1, wherein said D-substituted amino acid is [D-Leu-4].

11. The polypeptide of claim 1, wherein said D-substituted amino acid is [D-Pro-5].

12. The polypeptide of claim 1, wherein said polypeptide is cyclized.

13. The polypeptide of claim 1, wherein said amino acid sequence is SEQ ID NO: 18 and said D-isoform amino acid is selected from the group consisting of [D-Ser-1]; [D-Cys-2]; [D-His-3]; [D-Leu-4]; [D-Pro-5]; [D-Trp-6]; [D-Ala-7]; all [D]-OB3; and [D-Leu-4, D-Pro-5]-OB3.

14. A composition for modulating body mass, comprising a therapeutically effective amount of at least one polypeptide of claim 1, and a pharmaceutically acceptable carrier.

15. The composition of claim 14, wherein said peptide is [D-Leu-4]-OB3.

16. The composition of claim 14, wherein said peptide is [D-Pro-5]-OB3.

17. A method for treating or preventing a pathophysiology relating to homeostasis of body mass, comprising: administering a therapeutically effective amount of a composition of claim 1 to a subject in need thereof such that said pathophysiology is treated or prevented.

18. The method of claim 17, wherein said peptide is [D-Leu-4]-OB3.

19. The method of claim 17, wherein said peptide is [D-Pro-5]-OB3.

20. The method of claim 17, wherein said pathophysiology is selected from the group consisting of: obesity; hyperglycemia; hyperinsulinemia; hyperphagia; thyroid dysfunction; infertility; Type II diabetes mellitus; and non-insulin dependent diabetes mellitus.

21. The method of claim 17, wherein said pathophysiology is selected from the group consisting of anorexia, cancer, AIDS, hemataopoiesis dysfunction, tumor suppression, and other pathophysiologies related to a life-threatening decrease in weight.

22. The method of claim 17, wherein said composition is administered by injection into said subject.

23. The method of claim 17, wherein said pathophysiology is selected from the group consisting of: increased body fat deposition, hypothermia, impaired thyroid functions, and impaired reproductive functions.

24. A method for treating Type II diabetes mellitus, comprising administering a therapeutically effective amount of a polypeptide of claim 1 to a subject in need thereof such that said Type II diabetes is treated.

25. The method of claim 20, wherein insulin release is modulated in said subject.

26. The method of claim 20, wherein said peptide is [D-Leu-4]-OB3.

27. The method of claim 20, wherein said peptide is [D-Pro-5]-OB3.

28. An isolated polypeptide comprising [D-Leu-4]-OB3, wherein said polypeptide reduces body weight gain, food intake, water consumption, serum insulin levels, and blood glucose levels following administration in an obese mouse.

29. The polypeptide of claim 28, wherein the polypeptide reduces blood glucose levels after only 2 days of administration to the obese mouse.

30. The polypeptide of claim 28, wherein said polypeptide has no measurable effect on thermogenics of the obese mouse.

31. The polypeptide of claim 28, wherein exposure to said polypeptide for periods of up to one week is non-toxic, and wherein administration of said polypeptide produces no long-term adverse side effects.